

Departmental Syllabus
Math 4030 – Statistical Methods with Applications

Textbook: Statistics for Engineers and Scientists (First Edition), by Navidi, W.

Prerequisites: MATH 2740 with a grade of “C” or better

Calculators: Graphing calculator required; TI-83, 84, 85, or 86 recommended. (NOTE: on occasion, individual instructors may restrict the use of any type of calculator).

Course Description: Introduction to probability, density and distribution functions, special discrete and continuous distributions, estimation, hypothesis testing, chi-square, correlation and regression.

Topics and sections to be covered:

Chapter 1: Sampling and Descriptive Statistics

- 1.1 Sampling
- 1.2 Summary Statistics
- 1.3 Graphical Summaries

Chapter 2: Probability

- 2.1 Basic Ideas
- 2.2 Counting Methods
- 2.3 Conditional Probability and Independence
- 2.4 Random Variables
- 2.5 Linear Functions of Random Variables

Chapter 3: Propagation of Error

- 3.1 Measurement Error

Chapter 4: Commonly Used Distributions

- 4.1 The Bernoulli distribution
- 4.2 The Binomial distribution
- 4.3 The Poisson distribution
- 4.4 Some Other Discrete distributions
- 4.5 The Normal distribution
- 4.7 The Exponential distribution
- 4.8 The Weibull distribution (Gamma optional)
- 4.9 Probability Plots
- 4.10 The Central Limit Theorem

Chapter 5: Confidence Intervals

- 5.1 Large-Sample Confidence Intervals for a Population Mean
- 5.2 Confidence Intervals for Proportions
- 5.3 Small-Sample Confidence Intervals for a Population Mean
- 5.4 Confidence Intervals for the Difference between Two Means
- 5.5 Confidence Intervals for the Difference between Two Proportions

5.6 Small-Sample Confidence Intervals for the Difference between Two Means

5.7 Confidence Intervals with Paired Data

Chapter 6: Hypothesis Testing

6.1 Large-Sample Tests for a Population Mean **note: we will not use a compound H_0 , use =

6.2 Drawing Conclusions from the Results of Hypothesis Tests

6.3 Tests for a Population Proportion

6.4 Small-Sample Tests for a Population Mean

6.5 Large-Sample Tests for the Difference between Two Means

6.6 Tests for the Difference between Two Proportions

6.7 Small-Sample Tests for the Difference between Two Means

6.8 Tests with Paired Data

6.10 The Chi-Square Test

6.11 The F test for Equality of Variance

6.12 Fixed-Level Testing

6.13 Power

Chapter 7: Correlation and Simple Linear Regression

7.1 Correlation (omit inference)

7.2 The Least-Squares Line